Technical Report No. 576

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Center for the Study of Reading

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Abstract

This report contends that limited vocabulary knowledge is the principal cause of reading dysfunction for a large percentage of students whose progress in learning to read appears normal during the first two or three years of reading instruction, but who begin to fall behind starting somewhere between Grades 3 and 7. The report addresses the reasons this causal relationship has not achieved more prominence in the literature, including (a) disparate findings regarding the effects of vocabulary instruction on both vocabulary knowledge and on reading comprehension, (b) the reciprocal relationship between vocabulary and reading, and (c) the absence of clear, broad-based data demonstrating a high correlation between the vocabulary size of young readers and their subsequent reading development. Suggestions for remedying the problem are also presented.

THE ROLE OF VOCABULARY IN DEVELOPMENTAL READING DISABILITIES

The major contention of this report is that vocabulary figures prominently and causally in the first language reading difficulties of a large percentage of students whose progress appears normal during the first two or three years of reading instruction, but who begin to fall behind starting somewhere between third and seventh grade (Carroll, 1987; Chall & Jacobs, 1983; Chall, Jacobs, & Baldwin, 1990; National Assessment of Educational Progress, 1981). I contend that for many such students, perhaps the majority, limited vocabulary knowledge--both in terms of breadth and depth or richness of word knowledge--is the principal cause of reading dysfunction. I recognize that reading is a multifaceted behavior (Adams 1990a; Anderson, Hiebert, Scott, & Wilkinson, 1985), and that no single factor is likely to figure prominently in all reading difficulties (Mitchell, 1982; Stanovich, 1986). I nevertheless maintain that for many who experience reading difficulties, limited vocabulary knowledge is the key causal factor.

The strong connection between vocabulary and reading comprehension has long been recognized (Davis, 1944, 1968; Thorndike, 1973-74; Thurstone, 1946). Adams (1990a) opens her extensive and informative review of early reading by stating, "You should understand fully that the ability to read words, quickly, accurately, and effortlessly, is absolutely critical to skillful reading comprehension" (p. 3). Vocabulary is known to be a major factor in fluent reading (Davis, 1944; Dixon, LeFever, & Twilley, 1988; Thorndike, 1917; Thurstone 1946), in text difficulty (Chall, 1958, 1987; Coleman, 1971; Klare, 1974-75, 1984; Venezky, 1984), and in reading difficulties (Lesgold & Perfetti, 1978; Stanovich, 1986). It is held by many to be the most important factor in reading (Johnson, 1986, 1988; Johnson & Pearson, 1984; Johnson, Pittelman, & Heimlich, 1986; Perfetti, 1985, 1988; Thorndike, 1973-74), and its impact can reasonably be argued to be causal (Stanovich, 1986), though the exact nature of the causal relationships between vocabulary and reading has yet to be determined.

Recently, much research on early reading problems has focused on the roles of schematic knowledge (Adams & Collins, 1979; Anderson, 1985; Anderson & Pearson, 1984) and on aspects of decoding/lexical access, including issues of automaticity of lexical access (Lesgold & Perfetti, 1978; Perfetti, 1985, 1988; Perfetti & Lesgold, 1977, 1979) and the role of phonological coding in reading (Adams, 1990b; Naslund & Schneider, 1990; Shankweiler, 1990; Stanovich, 1986). While both of these areas are certainly of major importance in reading, I argue that there are large numbers of students who appear normal in these areas but who lack a well-developed meaning vocabulary, and that such students are likely to appear normal during initial instruction but are likely to experience major difficulties in reading starting in the later elementary grades.

I believe that there are at least three major reasons that the importance of a limited vocabulary size has not received more attention in the recent literature as a principal causal factor in developmental reading difficulties. One reason relates to disparate findings regarding the effects of vocabulary instruction on both vocabulary knowledge and on reading comprehension. While most studies that train vocabulary show that vocabulary knowledge can be taught through direct instruction (Mezynski, 1983; Petty, Herold & Stoll, 1968; Stahl & Fairbanks, 1986), the results with regard to reading comprehension are not consistent. Some studies find that instruction in vocabulary increases reading comprehension for passages containing the words taught (Beck, Perfetti, & McKeown, 1982; McKeown, Beck, Omanson, & Perfetti, 1983; McKeown, Beck, Omanson, & Pople, 1985). But other studies that demonstrate improvement in vocabulary fail to find an effect on reading comprehension (Jackson & Dizney, 1963; Lieberman, 1967; Pany & Jenkins, 1978; Pany, Jenkins, & Schreck, 1982; Tuinman & Brady, 1974). This, of course, is problematic in terms of establishing causal links. It is generally acknowledged that vocabulary instruction does appear to have a significant effect on the comprehension of passages containing the taught words, provided it involves sufficient depth, length, and/or intensity of instruction (Mezynski, 1983; Nagy, 1988). But even then, the effects of vocabulary instruction on reading

comprehension are generally not particularly robust. This has undoubtedly been partly responsible for caution on the part of researchers regarding claims of causal roles of vocabulary knowledge on reading.

In a similar vein, although some studies have found that comprehension is impeded when content words in a text are replaced by harder words (Kameenui, Carnine, & Freschi, 1982; Marks, Doctorow, & Wittrock, 1974; Wittrock, Marks, & Doctorow, 1975), others have found no decrease in comprehension (Freebody & Anderson, 1983; Stahl, 1989). Likewise, the results of research on text simplification (in which words in a passage are replaced with more frequent, and hence presumably easier words) are ambiguous, with some studies showing facilitation in comprehension (Marks et al., 1974; Wittrock et al., 1975), some showing no significant change (Ryder & Hughes, 1985; Tanner, 1976), and some even showing a decrease in comprehension and/or student satisfaction/interest level (Stahl, 1989). Generally speaking, fairly major modifications in vocabulary difficulty are required to significantly alter text comprehension (Freebody & Anderson, 1983). This finding can easily be interpreted as indicative of only a weak causal impact of vocabulary knowledge on reading comprehension.

A second factor that has contributed to the resistance to assigning vocabulary knowledge a more prominent causal role in developmental reading difficulties is that the relationship between vocabulary and reading is reciprocal (Stanovich, 1986). In fact, beyond Grade 3 or 4, reading is probably the principal means of vocabulary expansion for most readers (Nagy, 1988; Nagy & Anderson, 1984; Nagy, Anderson, & Herman, 1987; Nagy & Herman, 1987; Smith, 1982). This has led many researchers to concentrate on the vocabulary-through-reading aspects of vocabulary acquisition. The reasoning, which is quite sound when applied to the majority of readers, is that even good direct instruction can account for no more than perhaps 5-10% of vocabulary growth. Much of the remainder of word knowledge, therefore, must come from incidental acquisition in the course of listening and reading (Nagy, 1988). This would suggest that research energy should be directed toward methods and mechanisms for improving such incidental acquisition of vocabulary (Nagy & Herman, 1987; Nation, 1990). While this reasoning may be valid for the majority of readers--those who are successful readers--there is reason to question its validity for many of those who are "unsuccessful" readers (Beck, McKeown, & Omanson, 1987; Mason, Knisely, & Kendall, 1979; McKeown, 1985).

A third (and quite possibly the most crucial) reason for the resistance to according vocabulary knowledge a central role in developmental reading difficulties rests with the nature of standardized vocabulary assessment. Despite the fact that measures of text difficulty generally find that vocabulary difficulty accounts for somewhere between .41 and .93 of the variance in text difficulty (Anderson, 1979; Anderson & Freebody, 1981; Mezynski, 1983), clear, broad-based data demonstrating a high correlation between the vocabulary size of young readers and their subsequent development of reading are lacking. While after Grade 4 or 5 most poor readers show below-average vocabularies, early tests show that many of the students who will begin to experience reading difficulties starting in Grade 4 have an average vocabulary size (Chall & Jacobs, 1983). Why is this so?

I believe there are several reasons. First, most standardized vocabulary tests serve as part of a larger test, the purpose of which is usually to assess either the student's reading ability or reading readiness. This has important repercussions. Because their general focus is not vocabulary knowledge per se, such tests do not assess depth of vocabulary knowledge. Because of practicality considerations, most such tests employ a multiple-choice format. A discussion of the strengths and weaknesses of multiple-choice tests is beyond the scope of this report. The relevant point is that unless a test has been extensively tested and refined, an examinee who knows little about the meanings of some of the target words can answer many of the questions correctly. Given a test item for the word *pigeon*, for example, with alternatives such as (a) light, (b) floor, (c) food, (d) bird, the student who knows no more than that pigeon has something to do with flying, the sky, or "up there" will answer the item correctly.

So, almost without exception, standardized tests assess only very superficial levels of vocabulary knowledge (Curtis, 1987; Davis, 1944; Dolch & Leeds, 1953; Graves, 1986; Johnson, Moe, & Baumann, 1983). They thus tend to greatly exaggerate students' word knowledge in terms of what may be needed for reading comprehension. Knowing only that the word *pigeon* is somehow related to flying, the student will identify it correctly on a test; but this level of partial knowledge will be insufficient to aid the student appreciably in understanding most passages containing the word. And even low vocabulary students have at least some vague idea about the meanings of large numbers of words. Work by Carey (1978, 1982) and others has demonstrated that even very young children acquire a superficial knowledge of words very rapidly (what Carey calls "fast mapping"), but that achieving thorough word knowledge takes much longer--sometimes many months or years. Yet for knowledge of a word to aid reading comprehension, it probably has to be in-depth word knowledge (Perfetti, 1983).

Furthermore, for practicality of test administration, starting as early as Grade 2, standardized tests usually involve having students respond to written items. Thus, they primarily test knowledge of printed words. Because much of early reading instruction involves training in recognition vocabulary, which is virtually a proper subset of meaning vocabulary for even low vocabulary students, the set of words that students end up being assessed on is primarily not their meaning vocabulary, but rather their recognition vocabulary--the words that they can read (Chall, 1987). Chall estimates that it takes until Grade 4 for children to learn to identify in print the 3,000 words recognized by 80% of fourth graders; yet most of these words were already occurring in the spoken language of most children by Grade 1. This tendency in assessment to weight toward a limited subset of students' meaning vocabulary continues well beyond Grade 3. Eighty percent of words on sixth-grade vocabulary tests and more than 50% of the words tested on eighth-grade tests are among the 9,000 most frequent words (Johnson et al., 1983). So, while the size of students' vocabularies varies tremendously (Calfee & Drum, 1986; Chall, 1987; Templin, 1957)--with the vocabularies of the best third graders, for instance, being similar in size to those of the worst twelfth graders (Just & Carpenter, 1987, p. 107)--only a small portion of that variability is normally tested.

There is a further problem with standardized vocabulary tests: Most English words have multiple meanings. Among the highest frequency words, the incidence of polysemous words is especially high. According to Brown (1964), the 500 most common words in English have a total of 14,070 separate meanings, which is an average of 28 meanings per word. Approximately 72% of the most frequent 9,000 English words are polysemous, with some of these words having up to 50 different meanings (Johnson & Pearson, 1984). In first-grade primers, the incidence of polysemous words is around 90% (Searls & Klesius, 1984).

In terms of standardized tests, the problem is that in most cases, only the most common meanings of polysemous words are tested. A learner who knows only the most common meanings of a polysemous word will normally appear to know that word on a standardized test. Yet inadequate knowledge of nonprimary meanings of large numbers of polysemous words may have insidious repercussions when it comes to reading, particularly beyond Grade 3. The reader may not only lack knowledge of many of the meanings of the word as it is used in various passages, his knowledge of meanings that are inappropriate to the context may actually create more of an impediment to understanding than would not knowing the word at all (Tetewsky & Sternberg, 1986).

Even very low vocabulary learners are likely to know at least the primary and usually a few other major meanings of most frequently occurring words. The problem is that the texts assigned to students, even those with "controlled vocabulary," typically don't confine their usage to major meanings of words, especially beyond Grade 3.

So the young low vocabulary learner may well appear to be normal in terms of vocabulary knowledge. She appears to "know" the meaning of a word such as *met*, as it is used in "Harry *met* Sally." But that

same learner may not know *met* as used in "The environment met the needs of the Indians," an example taken from a widely used fourth-grade social studies text. Knowledge of a range of meanings for at least the more common polysemous words is thus integral to reading comprehension. Yet knowledge of other-than-major meanings of polysemous words is rarely, if ever, assessed on standardized tests.

For the low vocabulary learner, this lack of "richness" of vocabulary knowledge (i.e., in-depth knowledge of nonprimary meanings of polysemous words that appear in school textbooks), may prove deadly to reading, since the activation of the incorrect meanings of polysemous words can (and often will) interfere with understanding the sentence in which the unknown meaning occurs.

In short, what I claim is that most standardized vocabulary tests do not provide sufficient assessment of the richness of young readers' meaning vocabularies to demonstrate clearly the detrimental impact of a limited vocabulary on reading. I submit that while getting a low score is normally clear indication of a problem, getting an average or even above-average score does not necessarily indicate that a student has sufficient vocabulary knowledge to enable him to meet the very different demands of reading that he will encounter beginning in Grade 3 or 4.

Thus, based on the results of standardized testing, the young reader whose meaning vocabulary will soon prove inadequate to the rigors of content area reading typically appears to have a "normal" vocabulary. Provided that his decoding/phonics skills are normal, his progress in reading in the first few grades, in most cases, proceeds normally, and everything looks fine.

But then, when he reaches Grade 3 or 4, the nature of the reading experience changes. Reading no longer involves primarily learning to identify in print words that are for the most part already in his spoken/meaning vocabulary. It is assumed he "knows how to read," and reading becomes a vehicle for acquiring knowledge. Most of the other students in the class--those with average or above-average meaning vocabularies--continue progressing in their reading. After all, reading is probably the best way to improve reading ability (Anderson et al., 1985; Anderson, Wilson, & Fielding, 1988). But now a crucial component of the reading practice is reading with comprehension. And while it is true that readers can understand texts containing a fairly high density of unknown words (Freebody & Anderson, 1983), if too many of the words are unknown, or if too many are not sufficiently well known, the reader must direct conscious attention to them (Lesgold & Perfetti, 1978; Perfetti & Lesgold, 1977, 1979), and reading will be slowed to a point below which comprehension can be achieved (Gibson & Levin, 1975; Lesgold & Perfetti, 1978; Lesgold, Resnick, & Hammond, 1985). Reading with comprehension requires not only accurate word knowledge; it requires rapid access to meanings and rich decontextualized knowledge of the words (Beck et al., 1987; Perfetti, 1988).

Comprehension will be impaired for all readers when the density of words that are not known, or that are not known to a sufficient level of automaticity, is too high. For the average or above-average reader, sounding out a word that is not immediately recognized will, in most cases, evoke the appropriate conceptual information, because the spoken word is firmly ensconced in the reader's meaning vocabulary. By rereading the sentence after figuring out the meanings of the unknown word or words, the reader can usually surmount the problem of processing the text at a sufficient speed to prevent elements from the early parts of sentences being forgotten before they can be integrated with those near the ends of sentences.

But for the low vocabulary reader, there are simply too many words important to text comprehension that, even when sounded out, either are not in the student's meaning vocabulary, or that, while evoking some conceptual knowledge, do not enable comprehension because the student's partial knowledge of the word is still inadequate (Perfetti, 1988). The result is that even with effort, the low vocabulary reader is either unable to understand the text or else understands it only poorly. And, to the degree

that the text is not comprehended, learning does not occur. He thus fails to improve his word knowledge, his reading ability, and his world knowledge.

As the level of difficulty of assigned texts increases, the magnitude of the reading problem also increases, making it harder and harder for the low vocabulary student to comprehend and hence to learn words or information from the text. And because most of us do not willingly do things that we are poor at, the poor reader tends to read far less than the able reader, thus exacerbating the problem (Anderson et al., 1988).

The result is that the low vocabulary student is soon hampered in his use of what is almost certainly the most effective means of acquiring both vocabulary and world knowledge--reading. Thus, while reading serves effectively as a vehicle for improving the vocabularies of average or above-average readers, for the less-able reader, reading fails to provide the rate of incidental acquisition needed to keep his vocabulary developing at a rate that will enable him to maintain coursework (Beck et al., 1987).

The low vocabulary student is thus in a double bind: Although the best thing would seem to be having her read more to expand her vocabulary, what she is supposed to read is not comprehensible to her because it has too many unknown or insufficiently known words. She cannot effectively improve her reading ability, vocabulary, or world knowledge through reading, so she gets farther and farther behind.

I believe that for large numbers of poor readers, a limited meaning vocabulary is the critical factor. Those who can read well enough to understand their course materials continue to improve in all three areas. But those with small meaning vocabularies, because they cannot understand the texts they are assigned, can't keep up. It is a classic Matthew effect: The good readers get richer, the poor readers get poorer (Stanovich, 1986). Those who need the instruction the most benefit the least.

The position I espouse is essentially in accord with the instrumentalist hypothesis (Anderson & Freebody, 1981). I feel, however, that both the instrumentalist hypothesis and the knowledge hypothesis are accurate with regard to lexico-cognitive development. My position is somewhere between that of Cole (1940), Dupuy (1974), O'Connor (1934), Rinsland (1945) and others, who consider words to be tools for thought or "thought elements," and that of Miller (1974) and others, who consider vocabulary growth to be a manifestation of prior developments at deeper, more conceptual level of thought. I believe that the relationship between vocabulary and conceptual knowledge is reciprocal--that the more conceptual knowledge one possesses about something, the easier it is to learn associated vocabulary, but that vocabulary can also facilitate acquisition of conceptual knowledge. Thus, I see vocabulary improvement as a far from trivial task, involving the development of conceptual information in the learner.

I have not adequately addressed the possibility that it is a knowledge deficit rather than a vocabulary deficit that causes reading difficulties in the population I have defined. My answer is that to some degree it is a knowledge deficit, but to an important degree it is also specifically a vocabulary deficit. I think this can be demonstrated convincingly by noting the situation that typically occurs in second-language reading.

Consider a proficient first-language (L1) reader who tries to read a passage in a second language (L2). If the reader is not highly proficient in the second language, he is likely to experience considerable difficulty comprehending the passage. Comprehension difficulties occur even with a reader who is quite familiar with the topic of the passage. A major problem is that too many of the words are not known to the reader to a sufficient level of automaticity to allow his reading to proceed at a sufficiently rapid rate for comprehension (Gibson & Levin, 1975; Lesgold & Perfetti, 1978). But even when our L2 reader decodes the words he does know and rereads each sentence at a fast enough input rate to overcome limitations of working memory, if there remain too many words that do not sufficiently activate appropriate conceptual information, his comprehension will still be severely impeded or even

entirely precluded. Because our L2 reader is familiar with the passage topic, he has no lack of knowledge in the conceptual sense; he simply lacks the vocabulary needed to enable him to activate his existing appropriate conceptual knowledge. Yet that lack of vocabulary knowledge is sufficient by itself to preclude comprehension and the consequent increase in knowledge (lexical, other-linguistic, and conceptual) that would naturally (and largely unconsciously) result if the passage were comprehended.

Consider the parallels in the situations faced by most L2 readers and by low vocabulary L1 readers. In both cases, there tends to be a high density of unknown or insufficiently known words, normally causing the reader to slow down to a rate below that which enables comprehension. In both cases, a typical strategy is to try to sound out the unknown words. In both cases, even if sounding out the problem words enables the reader to access the appropriate concepts, the reader still has to reread the sentence to process the text fast enough for the sentence to be understood. And in both cases, some of the words, even when sounded out, will sometimes still be unknown or inadequately known (i.e, they will fail to activate sufficient appropriate conceptual information). In those cases, especially to the degree that the unknown words are numerous and/or are central to the ideas expressed in the sentences of the passage, the reader will be unable to activate sufficient relevant conceptual information to construct a model of the text, and comprehension will break down (Kintsch, 1986, 1988).

Readers must automatically access most of the words in the text, because a rapid rate of text processing is necessary for passage comprehension. Having related prior knowledge is, of course, critical to success. But it is not sufficient. Even with lots of relevant prior knowledge, a reader still must know most of the words that a text contains to comprehend it. And knowing entails possessing a considerable depth of knowledge about the word--vague or partial knowledge of a word's meaning may be of limited use in reading (Nagy 1988; Pearson, 1985; Perfetti, 1983).

The depth-of-knowledge aspect is normally less of a problem for the L2 reader than for the low vocabulary L1 reader. In most cases, the L2 reader already possesses relevant conceptual knowledge. To a large degree, successful reading in a second language involves learning new labels for known concepts, which at least in theory is relatively much easier than learning new labels for new concepts (Liu & Nation, 1984; Saragi, Nation, & Meister, 1978; Shefelbine, 1990) (though L2 instructional methodologies that attempt to prevent the learner from using the effective and efficient avenue of the L1 equivalent to activate relevant concepts and conceptual interrelationships often make the acquisition process unnecessarily difficult (Shand, 1990a, 1990b)).

The case of second-language reading makes it clear that relevant prior knowledge does not provide the whole answer. Even if the reader possesses relevant prior knowledge, and even if she can achieve sufficiently rapid decoding (by rereading), if the density of unknown words is too high, her comprehension will still be largely precluded.

There are of course some important differences between the low vocabulary L1 reader and the typical L2 reader who is a proficient reader in his first language. For the low vocabulary L1 reader, when sounding out the word does not activate appropriate conceptual information, in many cases it is because the reader lacks the relevant conceptual information. In the case of the L2 reader, the conceptual information is often present, though unknown L2 words prevent the reader from activating it. But the result is the same. To read with comprehension, there is simply no substitute for knowing most of the words, and knowing them well.

Because the problem for low vocabulary L1 readers goes beyond the lack of labels for concepts, it is perhaps reasonable to conclude that the reading difficulties of this group should be harder to overcome than those of L2 readers, because learning labels for unknown concepts involves learning the concepts as well as the labels. It should be comparatively easy for a proficient L1 reader to learn to read in a second language, because L2 reading involves primarily learning new (L2) labels for known concepts, which is easier than learning new labels for unknown concepts (Cunningham, 1987; Nagy et al., 1987;

Shefelbine, 1990). This will be true, however, only if an effective means can be found to enable the L2 reader to activate relevant conceptual information at the appropriate times, a situation that rarely obtains in L2 reading, although Shand (1990a, 1990b; Shand, Tapia, Melendez, & Ballantine, 1991) has proposed a way that this may be achieved. Yet despite this supposed advantage for L2 readers relative to low vocabulary L1 readers, relatively few L2 learners ever become fluent L2 readers. My point is simply that in all cases, whether L1 or L2, knowledge of the specific words that appear in passages is integral to successful reading--that vocabulary figures powerfully and causally in reading comprehension.

Is what I've proposed valid? Convergent evidence is provided by the facts that (a) correlations between listening and reading increase from Grades 1 through 4, and that (b) scores on listening comprehension measures show higher correlations with reading comprehension measures two or more years later than do verbal aptitude scores or even reading scores (Humphreys & Davey, 1983; Meyer, personal communication). Especially during the early school years, listening comprehension measures probably provide a more accurate assessment of vocabulary level than do standard measures of vocabulary, because such tests are more likely to contain words at and beyond the learners' vocabulary frontiers, including nonprimary meanings of polysemous words. Findings of listening comprehension measures strongly suggest that size of meaning vocabulary is an important factor in reading achievement.

If what I have argued is true, it is critical that young readers develop sufficient vocabulary and conceptual knowledge to enable them to deal with the written materials that they will encounter starting in Grade 4, because it is essentially only through the conscious learning and incidental acquisition that naturally occurs in the course of comprehending such materials that both their vocabulary and world knowledge will keep pace with the increasing demands of course materials.

So, how do we resolve the dilemma of the young low vocabulary reader? One major problem is that by Grade 4, when the problem surfaces in the form of reading difficulties, it is probably too late in most cases for effective remediation. Even with a far more efficient program of direct instruction than anything currently in widespread use, it would be virtually impossible to make up for a deficit that amounts to thousands of words and concepts (Chall, 1987; Templin, 1957; White, Graves, & Slater (1990). Once content area reading begins, the rapidly increasing deficit in world knowledge that a student experiences when he fails to learn from the written content area materials, and his resulting negative attitude toward reading, are likely to discourage the low vocabulary reader in a matter of months.

It is thus crucial that low vocabulary students be identified as early as possible in order to institute systematic, intensive programs to increase their rate of word learning. There are several student background factors, such as socioeconomic status (SES), that correlate with vocabulary that can help to identify high-risk students (Chall et al., 1990; Chall & Snow, 1982; Jordan, 1978; White et al., 1990; but because the development of literacy is so crucial in our society, *all* low vocabulary students need to be identified as early as possible, and certainly long before their reading problems develop. It should be noted, too, that a reasonable case can be made that SES is not really the important factor here, because low-SES students who have good language skills do as well as others (Chall et al., 1990; Chall & Jacobs, 1983; Chall & Snow, 1982).

I would argue that what needs to be assessed specifically are depth and breadth of "school English" vocabulary. While the meaning vocabularies of different student subpopulations may contain large numbers of nonstandard terms (Hall, Nagy, & Linn, 1984), it is imperative that students understand--and understand well and early--as many of the words as possible that they will encounter in their texts in Grades 4, 5, 6, and 7.

Beck et al. (1987) recommend teaching 400 words per year with rich instruction for Grades 3-9, and suggest that this is especially useful for those in the lower half of both reading achievement and SES

scales. Similarly, Becker (1977) argues for a concerted effort toward systematic vocabulary instruction in Grades 3-12. While these recommendations are noble, in my view they address the problem too late. I agree with Nagy (1988) and others that reading is probably the best vehicle for vocabulary expansion. And I also believe that when a reading problem develops beyond Grade 3, direct instruction will be unlikely to come even close to providing the quantity of vocabulary knowledge that wide reading provides naturally and effortlessly (Nagy et al., 1987). I believe that the key is to provide large-scale systematic vocabulary instruction in at least Grades K-3, and ideally even earlier, so that at the point that reading begins to serve as a vehicle for wholesale vocabulary expansion, the low vocabulary reader already will have developed a sufficiently large vocabulary that he can read his content area texts with understanding. In this way, the tremendous benefits of incidental vocabulary acquisition accrue naturally in the course of normal school instruction. However, imparting vocabulary knowledge on this scale will require major changes in the way that vocabulary instruction is typically practiced.

I'd like to note some other facts I believe may shed light on the equation of early reading success and later failure. With the exception of the small percentage of the population that has some type of neurological impairment that affects reading, most students, even those who have a limited meaning vocabulary, begin reading instruction without difficulty. High success rates in early instruction are common (Carroll, 1987; National Assessment of Educational Progress, 1981), and have been (perhaps sometimes erroneously) claimed as evidence supporting a range of alternative methodologies (e.g., "Writing to Read" [Martin & Friedberg, 1986]). I would maintain that the high success rate in initial reading results because early instruction temporarily eliminates vocabulary knowledge as a factor (as perhaps it should). In the early stages of reading, vocabulary is rigidly controlled (Chall, Conrad, & Harris, 1977; Chall & Stahl, 1985), with the result that the words presented in basal series are an almost entirely proper subset of the spoken (meaning) vocabularies of even low vocabulary learners. This situation continues into Grade 3. So reading in the first three grades effectively removes the vocabulary factor from the reading equation. Unfortunately, this also provides little avenue for the growth of meaning vocabulary for even low vocabulary learners (Chall, 1987). Thus, during the first three years of reading instruction, the vocabulary sizes of low vocabulary learners tend to continue to fall farther behind those of their more fortunate peers (White et al., 1990).

Next, I maintain that the very limited role of early reading in expanding students' vocabulary knowledge should recommend strongly the importance of reading aloud to students. All students, including low vocabulary students, can acquire appreciable vocabulary knowledge from having stories and other texts read to them (Eller, Pappas, & Brown, 1988; Elley 1988, 1989; Feitelson & Goldstein 1986; Wykes & Johnson-Laird, 1977). In addition, acquisition of word knowledge from listening to stories can be appreciably enhanced if the teacher explains the meanings of difficult words in the context of the story (Elley 1988, 1989).

Rereading the same story to students on several occasions can be especially beneficial for those with poorer vocabularies (Eller et al., 1988; Elley, 1988, 1989; Wykes & Johnson-Laird, 1977), presumably in part because the increased ability to predict what will come next frees up more working memory to attend to new words and to associate them to related known information. The technique of repeated readings of stories can thus provide an excellent source of growth in young learners' meaning vocabularies.

Reading aloud to students can probably serve to expand students' vocabulary knowledge at least through Grade 4 or 5, and quite possibly well beyond. It is especially crucial from preschool through Grade 3, because it provides meaningful presentation of words that are at the learners' zones of proximal development (Vygotsky, 1962, 1978) at a time when students' independent reading levels cannot. Differences in cognitive development and vocabulary level across students may mean that different students will learn different words from a given story, but as long as students can understand the story that is being read, acquisition of word meaning from context will operate for all (Stanovich, 1986).

The key point is that we must strive to develop the meaning vocabulary of low vocabulary students to a high enough level that they can deal with the huge influx of new words that they will encounter beginning in about Grade 4; if their meaning vocabularies are not sufficiently large by that time, remediation will be extremely difficult. Realistically, to achieve this end we must begin long before Grade 4. Parents should be strongly encouraged to read to children interactively, starting at a very young age (Adams, 1990a; Anderson et al., 1985). But there is also need to develop and institute a large-scale program of systematic vocabulary development, especially for those students who come to school with a below-average meaning vocabulary. Preschool is not too early; Grade 3 may be too late.

Why is it that children who are read to at an early age rarely experience problems with reading later on? One of the principal explanations that has been advanced is that such children develop positive associations with reading. I don't doubt this. Another explanation is that reading aloud to children familiarizes them with the printed word so that they become aware at an early age that the marks on the page somehow convey meaning. I don't doubt that either. But might it not also be the case that when parents read aloud interactively with children they are providing meaningful input containing vocabulary at the child's zone of proximal development--that children who are read to regularly are receiving an excellent source of comprehensible input providing a rich source for vocabulary development, and particularly the vocabulary that occurs in written English? The work of Elley (1988, 1989), Eller et al. (1988), Feitelson & Goldstein (1986), and Wykes and Johnson-Laird (1977) with older children strongly suggests that this is much more than just a possibility.

Reading aloud to children at an early age is thus likely to be highly beneficial. So is talking with children. I would argue that any linguistic input that is comprehensible to the child, and especially any input containing words with which the child is unfamiliar or marginally familiar and that occur in standard written English, will have positive repercussions all the way up the line, and especially on reading.

It is important from the point of view of vocabulary development, that materials contain new words so they will provide opportunities both for learning new word meanings consciously and for acquiring word meanings incidentally from context. This is also why it is important not to have vocabulary too rigidly controlled in reading materials (Chall, 1987; Chall et al., 1977), though this is rarely the case with reading materials in the first three grades (Willows, Borwick, & Hayvren, 1981; Shapiro & Gunderson, 1988). This makes it all the more important that students, particularly low vocabulary students, be exposed to a wide range of words in meaningful context through means other than reading.

Perhaps not every child receives sufficient quantities of such input. Or, perhaps the problem of low vocabulary results, as Sternberg & Powell (1983) propose, because there are appreciable differences in people's ability to learn from context. I believe, as they do, that individuals' capabilities vary over a fairly wide range; but I think there is need for caution when interpreting findings that show differences between high- and low-proficiency readers in learning from context. While individual differences are to be expected, the evidence, though appearing muddled on the surface due to uncontrolled variables, suggests that most people learn effectively from context when materials are appropriate to their level (Adams & Huggins, 1985; Eller et al., 1988, Elley, 1988, 1989).

I thus believe that good instruction, if sufficiently enlightened and intensive, and if initiated early enough, can increase the vocabulary knowledge of large numbers of young learners so that they will not experience the major negative repercussions that reading difficulties almost invariably entail. Unfortunately, at present there is insufficient knowledge of this whole area. There is a critical need for research on the role of breadth and depth of vocabulary knowledge on reading, for if it serves the critical causal role in reading development that I've proposed here, we must direct major efforts toward developing instructional procedures that will remedy vocabulary weaknesses of at-risk children. For while we already know something about some of the factors that make vocabulary instruction effective, (Carr & Wixson, 1986; Graves, 1986; Nagy, 1988; Stahl, 1983, 1985, 1986), much remains unknown.

There is perhaps nothing more important that education can accomplish than to assure that all students, by the time they reach the point at which reading becomes a principal vehicle for the expansion of both vocabulary/concept and world knowledge, have developed a vocabulary of sufficient breadth and depth to enable them to comprehend the materials that they will encounter in school. As Crowder (1982) so poignantly noted, "If education, and indeed civilization, could be boiled down into one crucial step, it would be the achievement of literacy" (p. 194). I suggest that literacy, and the concomitant expansion of vocabulary and world knowledge that normally accompanies literacy, cannot develop in the absence of a meaning vocabulary of sufficient breadth and depth to enable the child to deal with the texts that he will encounter starting in Grade 4. I thus concur with Carroll that "One of the primary tasks of the school, as far as language learning is concerned, is to teach vocabulary" (1971, p. 121).

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